Claims

1. A system comprising:

a fluid port comprising:

a fluid channel;

a fluid inlet at a first end of the fluid channel configured to couple to an outlet of a manually administrable fluid source; and

a fluid outlet at a second end of the fluid channel configured to deliver fluid from the manually administrable fluid source to a fluid pathway that provides fluid to a patient;

at least one sensor to characterize at least one attribute of the fluid from the manually administrable fluid source;

a flow controller in communication with the at least one sensor that generates at least one flow modification signal in response to the characterized at least one attribute matching at least one condition specified by at least one rule; and

a flow control valve in communication with the flow controller and positioned along the fluid pathway at a location separate and distinct from the fluid port, the flow control valve changing a level of flow restriction of fluid from the manually administrable fluid source passing therethrough in response to receiving the at least one flow modification signal,

wherein the at least one sensor or a second sensor is configured to automatically measure a withdrawn downstream fluid volume, wherein the withdrawn downstream fluid volume is a total volume of the fluid downstream of the inlet and still within the fluid channel after fluid flow through the fluid pathway is stopped.

2. A system as in claim 1, wherein the at least one sensor characterizes at least one attribute of the fluid from the manually administrable fluid source when the manually administrable fluid source is being coupled to the fluid inlet.

3. A system as in claim 1, wherein the at least one sensor characterizes at least one attribute of the fluid from the manually administrable fluid source when the manually administrable fluid source is coupled to the fluid inlet.

4. A system as in claim 1, wherein the at least one sensor characterizes at least one attribute of the fluid from the manually administrable fluid source when fluid is passing through the fluid channel.

5. A system as in claim 1, wherein the at least one sensor is integral or coupled to the fluid port.

6. A system as in claim 1, wherein the at least one sensor is separate and distinct from the fluid port.

7. A system as in claim 1, wherein changing a level of flow restriction of fluid from the manually administrable fluid source passing through the flow control valve comprises stopping all fluid from passing through the flow control valve.

8. A system as in claim 1, wherein changing a level of flow restriction of fluid from the manually administrable fluid source passing through the flow control valve comprises adjusting a current flow rate of fluid passing through the flow control valve to a higher or lower flow rate.

9. A system as in claim 1, wherein the flow controller comprises or is in communication with a rules engine, the rules engine using a plurality of rules to determine whether the at least one attribute matches the at least one condition specified by the at least one rule.

10. A system as in claim 9, wherein the flow controller polls at least one remote data source to obtain at least a portion of the rules.

11. A system as in claim 9, wherein the rules engine, when applying the rules, uses (i) the at least one attribute and (ii) flow control input data selected from a group consisting

of: fluid information, patient-specific information, medical order information, clinical guideline information, environmental factors, flow control valve status, and historical information.

12. A system as in claim 1, wherein the outlet of the manually administrable fluid source comprises fluid source information encoded thereon, and the at least one sensor comprises an identification sensor that detects the manually administrable fluid source information when the manually administrable fluid source is being coupled or is coupled to the fluid port inlet.

13. A system as in claim 12, wherein the fluid source information is a code or identifier used to reference a secondary data set that is characteristic of the fluid contained within the manually administrable fluid source.

14. A system as in claim 12, further comprising: memory storing the secondary data set.

15. A system as in claim 12, further comprising: a remote data source coupled to the flow controller via a communications network that stores the secondary data set.

16. A system as in claim 12, wherein the at least one flow modification signal is generated using a rules engine that processes the detected fluid source information.

17. A system as in claim 1, wherein: the at least one sensor comprises a fluid composition sensor that characterizes a composition of fluid, the fluid composition sensor is located along the fluid channel between the fluid inlet and fluid outlet, and the at least one attribute ~~is~~ indicative of at least one constituent present in fluid flowing through the channel.

18. A system as in claim 17, wherein the at least one flow modification signal using a rules engine that processes the result of the sensed fluid composition information.

19. A system as in claim 1, wherein the flow control valve is on the fluid pathway downstream from the fluid port.

20. A system as in claim 1, wherein the flow control valve is on the fluid pathway upstream from the fluid port.

21. A system as in claim 1, wherein: contents from the manually administrable fluid source do not reach the patient for at least a time T1 after the manually administrable fluid source begins fluid delivery into the fluid inlet, the flow controller and the flow control valve are configured to restrict flow in the fluid pathway within a time T2 < T1 after the manually administrable fluid source begins fluid delivery into to the fluid inlet.

22. A system as in claim 1, further comprising: a wireless transmitter to transmit data from the at least one sensor to the flow controller.

23. A system as in claim 1, further comprising: a wireless transceiver coupled to the flow controller to receive and transmit data relating to operation of the flow control valve.

24. A system as in claim 1, further comprising: a wireless receiver coupled to the flow control valve to receive a flow modification signal from the flow controller.

25. A system as in claim 24, further comprising: a wireless transmitter coupled to the flow control valve to send information to the flow controller indicative of a change in the level of fluid flow restriction being applied to fluid passing through the flow control valve in response to receiving the at least one flow modification signal from the flow controller.

26. A system as in claim 1, wherein the at least one sensor is selected from a group consisting of: identification sensors, flow sensors, and composition sensors.

27. A system as in claim 1, wherein the fluid is medication and the at least one attribute characterizes one or more of a group consisting of: medication type, medication concentration, medication volume, medication expiration date, a dosage form of the medication, dose instructions for the medication, administration instructions for a specific patient, medication formulation, medication manufacturer information, a re-packager of the medication, a distributor of the medication, medication package form, medication package size, medication package serial number, medication lot number, blood type, an RxNorm identification code, an NDC code (National Drug Code), a segment of an NDC code identifying a corresponding medication product, a segment of an NDC code identifying a corresponding medication package, a unique identifier code, a human readable alphanumeric string, and a machine readable code.

28. A system as in claim 1, wherein the fluid port further comprises a wireless transceiver for transmitting and receiving data to and from the flow controller, and the flow controller further comprises a wireless transceiver for transmitting and receiving data to and from the fluid port.

29. A system as in claim 28, wherein the flow controller transmits data to an external device other than the fluid port characterizing a state of the flow control valve.

30. A system as in claim 1, wherein the at least one flow modification signal is automatically initiated and executed by the flow controller without user intervention.

31. A system as in claim 30, wherein the at least one flow modification signal is automatically initiated and executed by the flow controller as a result of coupling the outlet of the manually administrable fluid source to the fluid inlet.

32. A system as in claim 30, wherein the at least one flow modification signal is automatically initiated and executed by the flow controller as a result of sensing the start of fluid flow into the fluid inlet.

33. The system of claim 1, further comprising:

an interface to provide audio and/or visual feedback to a user characterizing the at least one attribute and/or fluid contained within the manually administrable fluid source.

34. A system as in claim 33, wherein the interface provides an indication to the user of a state of the flow control valve.

35. A system as in claim 34, wherein the interface allows a user to input information to be used by the flow controller, in combination with information from the at least one sensor, to determine whether to generate the at least one flow modification signal.

36. A system as in claim 35, wherein the fluid is medication and the interface displays administration information and/or instructions associated with the medication.

37. A system of claim 36, further comprising:

memory storing the administration information and/or instructions associated with the medication.

38. A system as in claim 33, further comprising:

a communications module to transmit and/or receive the administration information and/or instruction to/or from a remote data source.

39. A system as in claim 33, wherein the interface is adjacent to the fluid port.

40. A system as in claim 33, wherein the interface is remote from the fluid port.

41. A system as in claim 1 further comprising:

a manual override element, which when activated by a user, causes the flow controller to cause the flow control valve to stop fluid flow in a first state or to allow fluid to flow in a second state.

42. The system of claim 1, further comprising:

a communications module to transmit and/or receive flow control input data, rules engine output data and/or data characterizing the fluid source to or from a remote data processing system.

43. The system of claim 42, wherein the remote data processing system forms part of a medical device and/or a medical information system.

44. The system of claim 1, wherein there are a plurality of fluid inlets, each configured to couple to an outlet of one of a plurality of manually administrable fluid sources.

45. A system as in claim 44, wherein there are a plurality of flow control valves, each flow control valve being coupled to the flow controller to selectively prevent fluid flowing from at least one of the plurality of fluid inlets.

46. A system as in claim 1, wherein the at least one sensor comprises a fluid flow sensor, and wherein the system further comprises:

an interface providing audio and/or visual feedback indicating how much fluid has been delivered as measured by the fluid flow sensor.

47. A system as in claim 1, wherein the at least one sensor comprises a fluid flow sensor, and wherein sensed fluid flow information causes the flow controller to generate a first flow modification signal to cause the flow control valve to transition to a first state when a first pre-determined volume has been delivered as measured by the fluid flow sensor, and after a pre-determined span of time, causes the flow controller to generate a second flow modification signal to cause the flow control valve to transition to a second state different than the first state.

48. A system as in claim 1, wherein the at least one sensor comprises an identification sensor that generates the at least one attribute using one or more technologies selected from a group consisting of: optical, magnetic, mechanical, conductive, switchable, infrared, switchable RFID, and proximity sensors.

49. A system as in claim 1, wherein the at least one sensor comprises a composition sensor that generates the at least one attribute using one or more technologies selected from a group consisting of: photometric analysis, electrometric analysis, chromatography, mass spectroscopy, physical property measurements, or parametric analysis based on a combination of technologies.

50. A system as in claim 1, wherein the at least one sensor comprises a fluid flow sensor that generates the at least one attribute using one or more technologies selected from a group consisting of: a paddle wheel flow meter, a turbine flow meter, a thermal flow meter, an ultrasonic flow meter, a pressure sensor, a differential pressure sensor, an optical sensor, an ultrasonic sensor, a coriolis flow meter, a displacement sensor.

51. A system as in claim 1, further comprising:

a reusable sub-housing; and

a disposable sub-housing,

wherein the reusable sub-housing is operatively coupled to the disposable sub-housing and the reusable sub-housing is intended for use by a plurality of patients and the disposable sub-housing is intended for use by a single patient.

52. A system as in claim 51, wherein at least the fluid inlet, fluid outlet, and flow channel are disposed within the disposable sub-housing.

53. A system as in claim 51, wherein the disposable sub-housing is included in a sterile pouch enveloping the disposable sub-housing.

54. A system as in claim 51 further comprising:

memory within the disposable sub-housing for storing data used by the flow controller to determine whether to generate the at least one flow modification signal.

55. A system of claim 1 further comprising:

a housing enveloping at least a portion of each of the fluid inlet, the fluid outlet, the flow controller, and the at least one sensor.

56. A system as in claim 55, wherein the housing has a shape and size allowing a user to hold the housing in a first hand while coupling the manually administrable fluid source in a second hand.

57. A system as in claim 56, further comprising:

a self-contained power source within the housing powering the at least one sensor.

58. A system as in claim 56, wherein the fluid pathway is an intravenous (IV) fluid line and the housing is suspended on the IV fluid line.

59. A system as in claim 58, wherein the housing comprises:

a reusable sub-housing; and

a disposable sub-housing,

wherein the reusable sub-housing is operatively coupled to the disposable sub-housing and the reusable sub-housing is intended for use by a plurality of patients and the disposable sub-housing is intended for use by a single patient.

60. A system as in claim 1, wherein the manually administrable fluid source is selected from a group consisting of: syringes, IV bags, disposable medication cartridges, disposable medication pouches, and IV tubing.

61. A system as in claim 1, wherein the at least one sensor polls a remote data source or data processing system to generate the at least one attribute.

62. A system as in claim 1, wherein the flow controller polls at least one remote data source or data processing system to determine whether the at least one attribute matches the at least one condition specified by the at least one rule.

63. A system comprising:

a fluid port comprising:

a fluid channel;

a fluid inlet at a first end of the fluid channel configured to couple to an outlet of a manually administrable fluid source; and

a fluid outlet at a second end of the fluid channel configured to deliver fluid from the manually administrable fluid source to a fluid pathway that provides fluid to a patient;

at least one sensor to characterize at least one attribute of the fluid from the manually administrable fluid source;

a controller in communication with the at least one sensor that generates at least one operation modification signal in response to the characterized at least one attribute matching at least one condition specified by at least one rule; and

a transmitter for wirelessly transmitting the operation modification signal to at least one device, the operation modification signal, when received by the at least one device, causing the at least one device to modify at least one operating parameter,

wherein the at least one sensor or a second sensor is configured to automatically measure a withdrawn downstream fluid volume, wherein the withdrawn downstream fluid volume is a total volume of the fluid downstream of the inlet and still within the fluid channel after fluid flow through the fluid pathway is stopped.

64. A system as in claim 63, wherein the at least one device comprises a flow control valve, and the operation modification signal causes a change in a level of fluid flow restriction of fluid passing through the flow control valve.

65. A system as in claim 63, wherein the at least one device comprises a medical device.

66. A system as in claim 64, wherein the medical device causes fluid flow through the fluid pathway to be restricted.

67. A system as in claim 1, wherein the flow controller receives data characterizing and/or relating to the patient that is used, in combination with information from the at least one sensor, to determine whether to generate the at least one flow modification signal.

68. A system as in claim 67, wherein the data characterizing the patient comprises at least one medication order, the at least one medication order being used to confirm whether the fluid in the manually administrable fluid source matches the at least one condition specified by the at least one rule specified by the at least one medication order.

69. A system as in claim 68, wherein the data characterizing the patient comprises a patient identifier and the flow controller polls at least one remote data store using the patient identifier to obtain reference information to determine whether to generate the at least one flow modification signal.